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(54) Title: SYNTHETIC GENE ENCODING RHESUS MONKEY CARCINOEMBRYONIC ANTIGEN AND USES THEREOF

Rhesus Monkey CEA Codon-Optimized Nucleotide Sequence

1 ATGGGACGCC CCAGCGCCCC CCTGCACCGC TGGTGCATCC CTTGGCAGAC
CCTGCTGCTG ACCGCCAGCC TGCTGACCTT CTGGAACCCC CCCACCACCG
101 CCCAGCTGCAC CATCGAGAGC CGCCCTTCA AGTGGGCGA GGGCAAGGAG
GTGCTGCTGC TGGCCACAAA GTGAGGCCAG AACCTGTTCG GCTACATCTG
201 GTACAGGGG GAGCGCGTGG ACGCCAGCCG CGCATCGCG AGCTGCGTGA
TCCGCACCCA GCGATACACC CCGGGCCCCG CCCACAGCGG CCGCAGAGAC
301 ATCGACTTCA ACGCCAGCCT GCTGATCCAC AACGTGACCC AGAGCGACAC
CGGCAGCTAC ACCATCCAGG TGATCAAGGA GGACCTGGTG AACGAGGAGG
401 CCACCGGCCA GTTCCGCGTG TACCCGAGC TGCCCAAGCC CTACATCAGC
AGCAACAACA GCAACCCCGT GGAGGACAAG GACGCCGTGG CCTGACCTG
501 CGAGCCGAGG ACCCAGGACA CCACCTACCT GTGGTGGGTG AACAAACAGA
GCCCTGCCGT GAGCCCCCGC CTGGAGCTGA GCAGCGACAA CCGCACCTTG
601 ACCGTGTTCA ACATCCCCCG CAAGGACACC ACCAGCTACA AGTGGCAGAC
CCAGAACCCC GTGAGCGTGC GCGGACGCGA CCCCCTGACC CTGAACGTGC
701 TGTACGGCCC CGACGCCCCC ACCATCAGCC CCTTGAACAC CCCCTACCGC
GCCGCGGAGA ACCTGAACCT GACCTGCCAC GCCGCCAGCA ACCCAACCGC
801 CCAGTACTTC TGGTTTCTGA ACGGCACCTT CCAGCAGAGC ACCCAGGAGC
TGTTCATCCC CAACATCACC GTGAACAACA CGGCAGCTA CATGTGCCAG
901 GCCCAACA GCGCCACCGG CCTGAACCGC ACCACCGTGA CCGCCATCAC
CGTGTACGCC GAGCTGCCCA AGCCCTACAT CACCAGCAAC AACAGCAACC
1001 CCATCGAGGA CAAGGACGCC GTGACCTGA CCTGCGAGCG CGAGACCCAG
GACACCACTT ACCTGTGGTG GGTGAACAAC CAGAGCCTGA GCGTGAGCAG
1101 CCGCTGGAG CTGAGCAAGC ACAACCGCAC CCTGACCGTG TTCAACATCC
CCGCAACGA CACCACTTTC TACGAGTGGG AGACCCAGAA CCCCCTGAGC
1201 GTGCGCGCA GCGACCCCGT GACCTGAAC GTGCTGTACG GCCCGACCG
CCCCACCATC AGCCCCCTGA ACACCCCTTA CCGCGCCGGC GAGAACCTGA
1301 ACCTGAGCTG CCACGCCGCC AGCAACCCCG CCGCCAGTA CAGCTGGTTC
GTGAACGGCA CCTTCCAGCA GAGCACCCAG GAGCTGTTC TCCCAACAT
1401 CACCGTGAAC AACAGCGGCA GCTACATGTG CCAGGCCAC AACAGCGCCA
CCGGCTGAA CCGCACCACC GTGACCGCA TCACCGTGTG CGTGGAGCTG
1501 CCCAAGCCCT ACATCAGCAG CAACAACAGC AACCCATCG AGSACAAGGA
CGCCGTGACC CTGACCTCGG AGCCCGTGGC CGAGAACACC ACCTACCTGT
1601 GGTGGGTGAA CAACAGAGG CTGAGCGTGA GCCCGCGCT GACGTGAGC
AACGGCAACC GCATCTGTAC CCTGCTGAGC GTGACCCGCA ACGACACCGG
1701 CCCCTACGAG TCGGCTATCC AGAACGCGA GAGCGCCAAG CGCAGCGACC
CGGTGACCTT GAACGTGACC TACGGCCCCG ACACCCCAT CATCAGCCCC
1801 CCGACCTGA GCTACCGCAG CCGCGCCAAC CTGAACCTGA GCTGCCACAG
CGACAGCAAC CCCAGCCCCC AGTACAGCTG GCTGATCAAC GGCACCTGC
1901 GCCAGCACAC CCAAGTGTCT TTATCAGCA AGATCACAG CAACAACAGC
GGCGCTACG CCTGCTTCGT GAGCAACCTG GCCACCGGCC GCAACAACAG
2001 CATCGTGAAG AACATCAGCG TGAGCAGCGG CGACAGCGCC CCGGCGAGCA
CGGCGCTGAG CGCCCGCGCC ACCGTGGGCA TCATCATCGG CATGCTGGTG
2101 GGGCTGGCCC TGATGTGA (SEQ ID NO:1)

(57) Abstract: Synthetic polynucleotides encoding rhesus monkey
carcinoembryonic antigen (CEA) are provided, the synthetic
polynucleotides being codon-optimized for expression in a human
cellular environment. The gene encoding CEA is commonly
associated with the development of human carcinomas. The
present invention provides compositions and methods to elicit or
enhance immunity to the protein product expressed by the CEA
tumor-associated antigen, wherein aberrant CEA expression is
associated with a carcinoma or its development. This invention
specifically provides adenoviral vector and plasmid constructs
carrying codon-optimized rhesus monkey CEA and discloses their
use in vaccines and pharmaceutical compositions for preventing and
treating cancer.

WO 2005/019455 A1



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